

REMARKS

Claim 1 has been amended to incorporate therein the recitation of claim 4. Claim 4 has been canceled. Additionally, claim 1 has been amended to delete the limitation as to the inner diameter of the pipe previously introduced in the Amendment filed November 7, 2005.

Entry of the amendment is respectfully requested as placing this case in condition for allowance.

Review and reconsideration on the merits are requested.

1. Rejection of claims 1, 3 and 7-9 over Blackmore in view of Friedman:

Claims 1, 3 and 7-9 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 1,701,401 to Blackmore in view of U.S. Patent No. 3,186,209 to Friedman. Blackmore was cited as substantially meeting the terms of the rejected claims, including a method of making a metallic shell from a metal pipe by subjecting the blank to a deformation process, the metallic shell having a multi-step through hole including a large diameter hole section (Fig. 3, recessed shoulder 15), an intermediate diameter hole section (Fig. 3, middle 11) smaller in diameter than the large diameter hole section and a small diameter hole section (Fig. 3, bottom) smaller in diameter than the intermediate hole section.

The Examiner relied on Friedman as teaching that extrusion is preferred for preserving the strength of a blank for a spark plug, citing column 3, lines 46-51.

The reason for rejection was that it would have been obvious to manufacture a spark plug using Blackmore's method, modified to extrude the large diameter hole section as taught by Friedman so as to preserve the strength of the shell.

In response, Applicants respectfully submit that the rejection is unfounded because there is no motivation to one of ordinary skill to combine Blackmore and Friedman. Namely, the shell of Blackmore is partially flared to form an expanded portion 11 and the remaining portion of the shell is not subjected to a deformation process. In contrast, the metal pipe for use in the present invention is subjected to extrusion and deformed in its entirety to yield a multi-stepped through hole, thus requiring resolution of a problem relating to the life of the tools or dies not encountered by Blackmore. Blackmore is thus not properly combinable with Friedman to teach the present invention, and even if properly combinable would not result in the present invention.

To advance prosecution, claim 1 has been amended to incorporate therein the recitation of claim 4 to thereby obviate the foregoing rejection. Withdrawal is respectfully requested.

2. Rejection of claims 2, 5 and 6 over Blackmore, Friedman and Fischer et al.:

Claims 2, 5 and 6 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Blackmore in view of Friedman, further in view of CA 645083 to Fischer et al. The Examiner relied on Fischer et al. as showing use of a punch to extrude a blank so as to allow for any desired flange configuration, such as an inner diameter of the pipe being larger than the small diameter hole section. The reason for rejection was that it would have been obvious to manufacture the spark plug of Blackmore with the inner diameter of the pipe being larger than the diameter of the small hole section and smaller than the diameter of the large diameter hole section, so as to allow for proper operation and fit with several internal combustion engine configurations.

As to claims 5 and 6, the Examiner again cited Friedman as teaching extrusion as a preferred method of manufacturing a spark plug shell. Fischer et al. was cited as teaching use of a punch and specific die to extrude a blank into a specific shape allowing for a manufacturing process that can meet different spark plug structures to fit a variety of engines.

Claims 2, 5 and 6 depend on claim 1, and therefore include all of the limitations of claim 1. The foregoing rejection is therefore obviated by amendment of claim 1 to incorporate therein the recitation of claim 4. Withdrawal is respectfully requested.

3. Separate Patentability of Claim 2:

Applicants further comment on separate patentability of claim 2 as follows.

As discussed at page 12, lines 4-15 of the specification, in accordance with a preferred aspect of the invention (as claimed in claim 2), the inner diameter of a pipe that is used as a starting material is larger than the small diameter hole section 8S and smaller than the large diameter hole section 8L of the multi-stepped hole 8. By this aspect, an amount of metal to be processed (i.e., an amount of metal that is caused to flow for forming the multi-stepped hole 8) can be smaller. This makes it possible to elongate the life of the tools or dies while making it possible to produce the metallic shell 2 with a high accuracy and at low cost.

Although the Examiner cited Fischer et al. as showing use of a punch to extrude a blank allowing for any desired flange configuration, none of the prior art cited by the Examiner shows, teaches or otherwise leads one of ordinary skill to select an inner diameter of the pipe so as to be larger than a diameter of the small diameter hole section and smaller than a diameter of the large diameter hole section. Clearly this is not shown by Blackmore (where the inner diameter of the

pipe is said to be equal to the diameter of the small diameter hole section); nor by Friedman (Friedman starts with rod stock, but no pipe - see column 17, lines 12-15); nor by Fischer et al. Like Friedman, Fischer et al. starts with solid blank 11 as a starting material, but no "pipe".

Thus, to the extent that the Examiner believes that it would have been obvious to extrude pipe 9 of Blackmore such that the inner diameter of the pipe is larger than a diameter of the small diameter hole section and larger than a diameter of the large diameter hole section, the Examiner can only be improperly drawing such teaching from Applicants' specification. The reason "to allow for proper operation and fit within several internal combustion engine configurations" also does not come from any of the prior art cited by the Examiner. Rather, as taught by the present Applicants, the embodiment of present claim 2 makes it possible to elongate the life of the tools or dies while making it possible to produce the metallic shell with a high accuracy and at low cost. None of this is taught by the cited prior art.

4. Rejection of Claim 4 over Blackmore, Friedman and Hamilton:

Claim 4 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Blackmore in view of Friedman, further in view of U.S. Patent No. 1,726,264 to Hamilton. The Examiner considered that one of ordinary skill would arrive at the configuration of claim 4 (i.e., an outer diameter of the pipe is larger than that of the tip end side of the tubular portion of the metallic shell and smaller than that of the intermediate tubular portion) to allow for a better internal securing configuration or "internal shoulder" as evidenced by Hamilton.

Claim 1 has been amended to incorporate therein the recitation of claim 4. Claim 4 has been canceled. Applicants respectfully traverse for the following reasons.

Hamilton starts with a flat, circular piece of drawing steel 8 (page 1, lines 40-41 and Fig. 1), and has no disclosure with respect to subjecting a pipe-shaped blank to a deformation process. For the same reasons, there is nothing in Hamilton (or any of the other prior art cited by the Examiner) which shows, discloses or otherwise teaches or suggests an outer diameter of the pipe that is larger than that of the tip end side tubular portion of the metallic shell and smaller than that of the intermediate tubular portion. Thus, it is respectfully submitted that the Office Action does not establish a *prima facie* case of obviousness, because all of the claim limitations are not taught by the prior art, a basic requirement of MPEP § 2143.03. Furthermore, as above, because the particular configuration required by claim 4 as incorporated into claim 1 is not taught or shown in any of the cited prior art, the Examiner could only have arrived at the invention of claim 4 by improperly consulting Applicants' specification.

The embodiment of claim 4 is described at page 13, line 11 of the specification, *et seq.* In accordance with this aspect of the invention, the amount of metal to be processed (i.e., an amount of metal caused to flow for forming the tip end side tubular portion 22, intermediate tubular portion 21 and base end side tubular portion 23) can be made smaller, thus making it possible to elongate the life of the tools or dies used for carrying out the method and produce the metallic shell 2 with a high accuracy and at low cost. None of this is taught or suggested by the cited prior art.

For the above reasons, it is respectfully submitted that the claims as amended are patentable over Blackmore in view of Friedman, further in view of Hamilton and withdrawal of the foregoing rejection under 35 U.S.C. § 103(a) is respectfully requested.

Withdrawal of all rejections and allowance of claims 1-3 and 5-9 is earnestly solicited.

In the event that the Examiner believes that it may be helpful to advance the prosecution of this application, the Examiner is invited to contact the undersigned at the local Washington, D.C. telephone number indicated below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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